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Reflecting on SCN in Iowa Through the Years

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Abstract
I recently moved offices for the first time since arriving at Iowa State University in February 1990. While moving, I uncovered several things that I had not seen in many years. One of those items was a faded news article that a colleague sent me written by Doug Lindner in the Algona Upper Des Moines newspaper originally published on September 2, 198.

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Reflecting on SCN in Iowa Through the Years

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I recently moved offices for the first time since arriving at Iowa State University in February 1990. While moving, I uncovered several things that I had not seen in many years. One of those items was a faded news article that a colleague sent me written by Doug Lindner in the Algona Upper Des Moines newspaper originally published on September 2, 1988 (see figure below, article is available online here).

The article described a visit to north central Iowa in 1988 by newly appointed Dean of the ISU College of Agriculture David Topel. He traveled to speak with farmers, legislators, and agribusiness and extension personnel about an emerging threat to soybean production in Iowa - the soybean cyst nematode (SCN).

8–Algona (Ia.) Upper Des Moines Friday, September 2,1988

ISU Ag Dean ready for rascal roundworm

By Doug Lindner
Staff Writer

"We're going to have to attack it at a cellular level," the gaunt, soft-voiced man replied. "The secret is to learn its cell cycle and break it. We have that capability."

Who has the capability to destroy an organism at the core of its structure?

Dean of Agriculture David D. Topel, of Iowa State University is the man and a parasitic roundworm is the target.

Topel visited with local farmers at the Kossuth County Extension Office last Thursday to discuss the problems caused by Soybean Cyst Nematodes.

Topel explained how funding for research was needed to begin the battle against the nematode, which is destroying up to 20% of the soybean yield where it is present.

"If we get support in the upcoming legislature, we can take care of this thing right away," the newly appointed dean said. He added the university plans to solicit from the state and the Board of Regents right away.

A panel of three area farmers addressed the crowd on the effects of the parasitic roundworms on their farms.

"Our corn yields have been growing," said Dale Brandt, Swea City. "But I'll tell you right now that I could raise better soybeans 15 years ago than I can today." Along with John and Henry Pedersen, Brandt brought examples of the problem. Each of the farmers brought soybean plants from their fields and placed them at the front of the room.

"I've got spots where there's nothing," he said disgustedly. "Just black ground. It killed them."

Brandt asked Topel to research the problem and work toward developing a resistant strain of soybean. "We're just shooting in the dark, trying to find something that works." He explained many farmers shared the problem of finding a soybean that could survive in an infested field.

Representative Clifford Branstad was also in attendance and gave his whole-hearted support to the funding for the university. He challenged trends in improving the commercial economy of Iowa and told the audience Iowa will always depend on the farm economy.

"If we don't support agriculture, we're in big trouble. There can't be a more important economic issue in the state," he declared.

The cyst is a nodule formed on the root of a soybean by the dead body of a female roundworm carrying eggs. Up to 200 eggs can be carried in the cyst for periods in excess of four years.

"We've had Soybean Cysts for about ten years, and the resources have not been there," said Iowa State Extension Director John Ley, who headed the meeting. "We would like to impress Dean Topel with the problem."

Presently, 34 counties in the state are infested with the nematodes, which feed on the nutrients intended for the plant.

Measuring only four-hundredths of an inch long, the cyst is the only part of the problem visible to the naked eye, according to John Ley. Although the actual life of a nematode lasts approximately one month, the eggs can hibernate during the winter and survive for long periods.

The majority of the meeting was spent discussing the characteristics of the nematode problem and possible solutions.

Jim Hill, Hancock County Extension Director, presented a chart examining the production of soybeans in Winnebago County as compared top surrounding counties with similar soil types. Over a nine year period, Winnebago County has lost $19 million in crops for some reason, assumed to be Soybean Cyst Nematodes.

When compared to other counties, the yield per acre of Winnebago soybean fields was consistantly lower, said Hill.

At present, there is no way to eradicate the nematode, said Dr. Don Norton, nematologist. While corn is immune to the nematodes, he added, the eggs can survive for years in a dormant stage. Spraying the corn for nematodes would be of little use, he said. "If the infestation is severe," he added, "you have to go three years of corn before you can change to soybeans."

(online at https://algonalib.newspaperarchive.com/algona-upper-des-moines/1988-09-02/page-8/)

SCN in Iowa - a retrospective

Reading the news article from 1988 again made me reflect on the SCN situation in Iowa over the past several decades. Looking back, some things that stand out to me include:

- SCN spread from a single county in Iowa (Winnebago County) in 1978, to 34 counties in 1988, to all 99 Iowa counties in 2016. Also, SCN currently is found in every soybean-producing state in the United States except West Virginia.
- SCN consistently has been identified as the most damaging pathogen of soybeans in Iowa and in the United States since the mid 1990s.
- The number of SCN-resistant soybean varieties for Iowa has increased from about 20 in the early 1990s to more than 1,000 in 2017.
- Nematode-protectant seed treatments were introduced as a much-needed new tool for managing SCN in the last decade.

Perceptions about SCN in Iowa have changed over the decades - from grave concern over severe damage in the 1980s (see figure above), to a unified call for testing of fields for SCN in the 1990s ("Take the Test, Beat the Pest" - The SCN Coalition), to effective management of SCN in the 2000s. What about now?

SCN in Iowa - now and in the future

Managing SCN used to be pretty routine. Once a field was found to be infested with SCN, a farmer simply had to grow resistant soybean varieties in rotation with corn in that field. And there were hundreds of SCN-resistant soybean varieties for Iowa available by the end of the 1990s. Currently, few soybean varieties are described as being not resistant (i.e. susceptible) to SCN.

Almost all SCN-resistant soybean varieties since the early 1990s were developed from the same soybean breeding line, or "source of resistance", named PI 88788. These resistant varieties controlled most (> 90%) SCN reproduction for many years. But researchers from several states who were monitoring the reproduction of SCN populations on resistant soybean varieties detected a troubling trend over the years – SCN populations were becoming resistant to the resistance.

Currently, SCN populations that reproduce well on resistant soybean varieties with the PI 88788 source of resistance are common and widespread throughout Iowa and the Midwest.

Put simply: soybean varieties with PI 88788 SCN resistance no longer control SCN well in many (most?) fields in Iowa and in several other states. Also, farmers are losing yield as a result of increased SCN reproduction on resistant soybean varieties.

So, what's a farmer (or agronomist) to do?

Managing SCN for the long term requires active effort like never before. The SCN Coalition from the 1990s has re-formed now to emphasize this situation. Recommendations from the SCN Coalition are:

- Collect soil samples from fields before every second or third soybean crop to monitor changes in SCN population densities (numbers) over time.
- Use a broad-based, multi-faceted approach to manage SCN. Available management strategies include SCN-resistant varieties, nonhost crops (like corn), and nematode-protectant seed treatments.
- Seek out and grow SCN-resistant soybean varieties with sources of resistance other than PI 88788. Currently, "Peking" is the most common non-PI 88788 source of SCN resistance available.

Go to www.TheSCNCoalition.com for more information about the SCN Coalition, including a timeline of SCN history, data illustrating the gradual buildup of resistance-breaking populations of SCN and associated yield losses, lists of SCN experts and soil-processing laboratories in every state in the United States and in Canadian provinces, and state-specific SCN management recommendations. The SCN Coalition is funded by the soybean checkoff through the North Central Soybean Research Program and the United Soybean Board and by industry partners.

Category: Plant Diseases

Crop:

Soybean

Tags: SCN

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